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What's New In ProLiant Network Teaming

Abstract: This white paper is intended for anyone needing information on Compaq's Network Teaming Software for NC3xxx, NC6xxx, and NC7xxx series of Ethernet adapters used in ProLiant servers.

Topics covered in this white paper are:

- New features found in version NCDE 7.0 drivers
- Cross-reference Teaming chart for adapters by operating systems
- Information on supported Team types by operating system as well as where to configure those teams

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White Paper prepared by ISSG/Austin Development Group

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New Features

In 1994, Compaq was one of the first vendors to release a teaming driver with failover support for Microsoft Windows NT 3.51. Since that time, many enhancements have been made including support for additional operating systems as well as load balancing traffic across multiple network adapters.

The latest release, version NCDE¹ 7.0, continues to build on many years of experience. Numerous enhancements have been made to Compaq's Network Teaming Drivers; the improvements range from simple cosmetic changes to new functionality.

Compaq continues to add value to the NC series Ethernet adapters making them the ideal networking adapter for customers using ProLiant servers. Listed below are the new features, a brief description of the feature and its benefit to you, the customer.

Table 1. New Features In NCDE 7.0

Category	Feature	Description	Customer Benefit
General	New Control Panel and System Tray icons	In Microsoft Windows operating systems, the icon for Compaq Teaming has been changed.	The new icon stands out more and is more easily identifiable as associated with Compaq Teaming.
	Team Naming	The user can now change the default team name.	This allows the user make more descriptive and relevant team names, especially helpful in servers with multiple teams.
	Added Advanced Settings tab to the Properties configuration dialog.	Allows user access to the Advanced Settings for both NICs and Teams.	Changing the Advanced Settings allows the user to tune the adapter or Team's performance.
	Apply button removed from main GUI dialog.	Simplified the GUI by removing redundant button.	Removing the Apply button resolves confusion with the OK button.
	No reboot is required in Windows 2000 after configuring teams.	After creating new Teams or making changes to existing teams, only in very rare instances where the operating system itself requests it, will a reboot be required.	Increased productivity from fewer reboots of the server.

¹ NCDE stands for Network Controller Driver Ethernet

Category	Feature	Description	Customer Benefit
	Cable Analysis	For the Compaq NC7770 PCI-X Server Gigabit Adapter, a new tool is provided to help troubleshoot cable problems at Gigabit speeds.	Length Tab - the user can verify cable length and determine whether the configuration has the appropriate cable. This allows the user to determine whether the problem is with the adapter or in the cable plant. Frequency Tab - Two graphs represent the values calculated by the Cable Loss and Return Loss test algorithms versus the IEEE 802.3ab limit. This shows the relative quality of the cable.
Network Fault Tolerance (NFT) Teams	Initial Primary	For Manual and Fail On Fault Team types, you may now set which adapter will be the primary adapter when the Team is configured.	Allows the setting of the most capable adapter to be used initially when the Team is configured and whenever the server is booted.
	Change Mode button added.	Allows the user to change between Manual, Fail on Fault, and Smart Switch.	Easier reconfiguration of the NFT Team types.
Transmit Load Balancing (TLB) Teams	Name changed from Adaptive Load Balancing (ALB)		TLB is a more accurate name for the provided functionality.
	Initial Primary	You may now set which adapter will be the primary adapter when the Team is configured.	Allows the setting of the most capable adapter to be used initially when the Team is configured and whenever the server is booted.
Switch-assisted Load Balancing (SLB) Teams	Name changed from Fast EtherChannel & Gigabit EtherChannel (FEC/GEC)		SLB Teams can be used with a wide variety of intelligent switches. SLB Teams continue to work with Cisco switches in EtherChannel mode but they also work with other vendors such as Bay, Nortel, Extreme, and Intel to name a few. SLB Teams also work with intelligent switches that support 802.3ad Static Mode Configuration.

Adapter/Operating System Teaming Cross-Reference Chart

Netelligent Ethernet Adapters, which discontinued in 2000, can only be teamed with other Netelligent Adapters in NFT Teams. While new drivers have been and will continue to be released for Netelligent adapters, they cannot be teamed with any NCxxxx series of Ethernet adapters.

Below is the cross-reference chart by adapter showing which adapters may be teamed with which other adapters in the various supported operating systems.

Not all team types and features are supported in each operating system. Please refer to the tables in the next section as well as the documentation provided with the Compaq network adapter drivers for each operating system to find out specifically what features are supported.

For the most up to date list of Linux distributions supported, refer to Compaq's FTP site for the Compaq ProLiant Network Adapter Software Compatibility Reference Table found here:

<ftp://ftp.compaq.com/pub/products/servers/networking/ossupport.pdf>.

Table 2. Network Adapter/Operating System Cross Reference

	NC31xx	NC61xx	NC71xx	NC77xx
Fast Ethernet				
NC31xx	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8 ² , Caldera OpenServer 5 ³	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, Caldera OpenUnix 8
Fiber Gigabit				
NC61xx	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8, Caldera OpenServer 5	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, Caldera OpenUnix 8
Copper Gigabit				
NC71xx	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, NetWare 4-6, Caldera OpenUnix 8, Caldera OpenServer 5	Windows NT 4.0, Windows 2000, Caldera OpenUnix 8
NC77xx	Windows NT 4.0, Windows 2000, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, Caldera OpenUnix 8	Windows NT 4.0, Windows 2000, NetWare 4-6, Linux, Caldera OpenUnix 8

² Caldera OpenUnix 8 was formerly named SCO UnixWare 7. Either version may be used.

³ Caldera OpenServer 5 was formerly named SCO Open Server 5. Either version may be used.

Supported Features By Team Type

Microsoft, Novell, Caldera as well as various distributions of Linux can exploit the use of Teaming software. Table 3 lists the supported operating systems and the different Team types supported in these operating systems.

Table 3. Supported Team Types

Operating System	NFT	TLB	SLB
Windows NT 4.0	√	√	√
Windows 2000	√	√	√
Novell NetWare 4-6	√	√	√
Linux	√	√	√
Caldera OpenUnix 8	√		
Caldera Open Server 5	√		

Depending upon the operating system utilized on your ProLiant server, there are different ways to configure the Team of network adapters. Table 4 includes information on what utilities can be used to configure the NC series Ethernet adapters in Teams in the supported operating systems.

Table 4. Where To Configure Your Teams In Supported Operating System

Operating System	Where To Configure
Windows NT 4.0	CPQNTAC in Control Panel
Windows 2000	CPQTeam in Control Panel
Novell NetWare 4-6	Command line statements added to AUTOEXEC.NCF
Linux	Execute BASPCFG from command line
Caldera OpenUnix 8	Execute NETCFG from command line
Caldera Open Server 5	Execute CPQNIM from command line

A comprehensive and technical discussion of Compaq's Teaming under Microsoft's Windows 2000 operating system can be found in the white paper titled "Compaq Network Adapter Teaming Technology" document 162M-0102A-WWEN and can be found on www.Compaq.Com - please refer to that end of the document for links on ProLiant Networking. Table 5 has been copied from that white paper for your reference.

Table 5. Supported Features By Team Type

Teaming Type	NFT	TLB	SLB
Number of adapters supported per team	2-8	2-8	2-8
Supports Fault Tolerance	√	√	√
Supports transmit load balancing		√	√
Supports receive load balancing			√
Requires a switch that supports a compatible form of load balancing			√
Can connect a single team to more than one switch for switch redundancy (must be same broadcast domain)	√	√	Switch dependent
Utilizes heartbeats for network integrity checks	√	√	
Can team adapters that don't support a common speed	√		
Can team adapters operating at different speeds as long as the adapters support a common speed	√	√	√
Can team adapters of different media	√	√	√
Maximum theoretical transmit/receive throughput (in Mbps) with maximum # of 100Mbps adapters	100/100	800/100	800/800
Maximum theoretical transmit/receive throughput (in Mbps) with maximum # of 1000Mbps adapters	1000/1000	8000/1000	8000/8000
Load balances TCP/IP		√	√
Load balances IPX/SPX			√
Load balances SNA			√
Load balances NetBEUI			√
Load balances AppleTalk			√
Supports load balancing by destination IP address		√	√
All adapters within a team utilize the same MAC address on the network			√
All adapters within a team utilize the same IP address on the network	√	√	√

For complete information on Compaq's Network Adapters for ProLiant Servers including product descriptions, solutions tables, comparisons and part numbers, visit <http://www.compaq.com/products/servers/networking/index.html>.

Driver updates, including NCDE 7.0 may be found at <http://www.compaq.com/support/files/networking/nics/>.